

# Cornelius Bond Package Traffic Analysis

Prepared by Parsons Brinckerhoff July 21, 2014



#### Introduction

- Parsons Brinckerhoff was tasked with evaluating potential road improvement projects identified in the Town's upcoming Bond Package.
  - 9 Projects identified by the Town
  - Traffic analysis performed on affected intersections
  - Operational benefits calculated based on analysis results
  - Cost estimates developed for conceptual improvements
  - Benefit-Cost ratio determined for each project
  - Projects ranked based on B/C ratios



## **Background & Methodology**

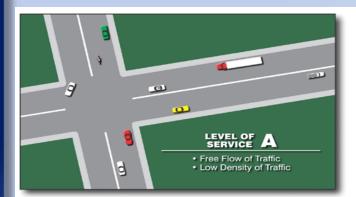
- Traffic counts were collected at impacted intersections
- 1.5% growth rate for 2035 projected traffic volumes
- Trip distributions based on current traffic volumes/patterns
- No-Build and Build scenarios compared to existing conditions



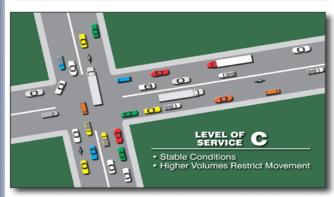
- Congestion measured using Delay/Level of Service (LOS)
- Overall rankings based on 80% Operations, 15%
   Connectivity, and 5% Safety

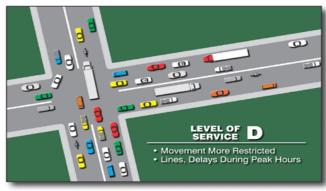


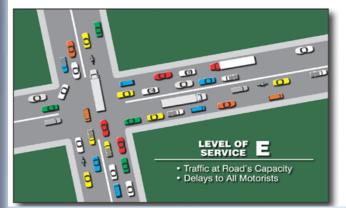
#### **Level of Service (LOS)**

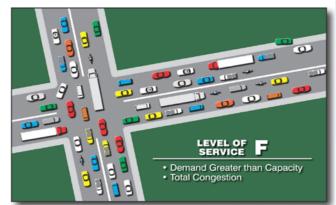














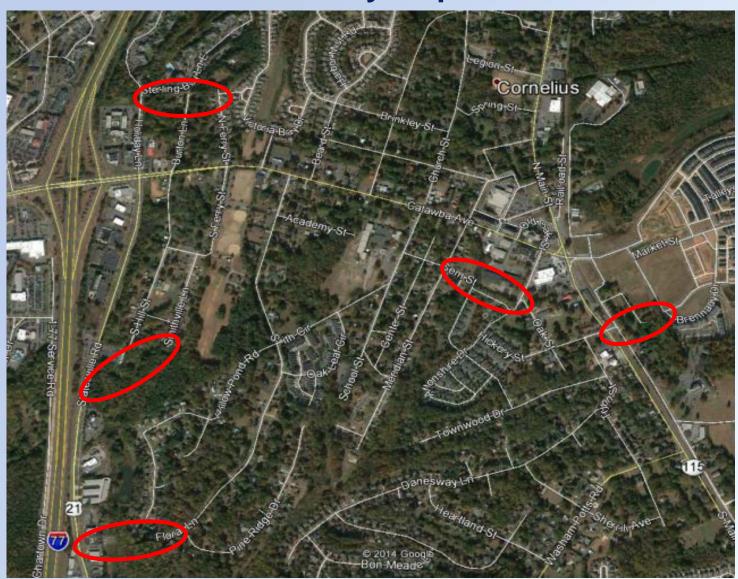
## **Bond Projects**

- 9 Projects Identified
  - Widening Catawba Avenue
  - Floral Lane extension to Statesville Road
  - Smithville Lane extension to Statesville Road
  - Re-alignment of Bailey Road to Statesville Road
  - ➤ Intersection improvements at Bailey Road & Old Statesville Road
  - Intersection improvements at Westmoreland Road & Statesville Road
  - Gem Street extension to Oak Street
  - Hickory Street extension to Antiquity
  - Holiday Lane-Ferry Street Connector





# **Vicinity Map**



PARSONS BRINCKERHOFF

## **Catawba Avenue Widening**

- Analysis for left turn lanes at 4 intersections
  - > Ferry Street
  - ➤ Lake Village Blvd
  - > Smith Circle
  - School Street/Church Street
- Low turning volumes along corridor



			AM Peak		PM Peak			
Intersection		2014	2035 No-Build	2035 Build	2014	2035 No-Build	2035 Build	
Catawba Avenue & Ferry	LOS	С	D	D	С	D	D	
Street	Delay (sec)	19.1	31.6	31.6	18.7	31.3	31.1	
Catawba Avenue & Lake	LOS	В	С	В	В	В	В	
Village Blvd	Delay (sec)	12.8	16.8	14.9	11.7	14.5	13.2	
Catawba Avenue &	LOS	Α	В	В	Α	Α	Α	
Smith Circle	Delay (sec)	9.1	13.2	11.9	4.6	9.1	8.7	
Catawba Avenue & LOS		Α	Α	Α	Α	Α	Α	
School Street	Delay (sec)	6.7	6.7	5.9	6.9	7.5	6.9	





## **Catawba Avenue Widening (Cont.)**

- ❖ Problem is I-77/US 21 & NC 115 capacity issues
  - 2014 Animation
  - 2035 No-Build Animation
  - > 2035 Build Animation
- Enhances safety and reduces traffic queuing
- Operations benefit from I-77/US 21 & NC 115 improvements

- Two estimates developed
  - ➤ Individual Turn Lanes \$3,000,000
  - Continuous Center Lane \$6,000,000
- Lowest B/C ratio & overall ranking



#### **Floral Lane Extension**

- Proposed extension of Floral Lane to Statesville Road
- Eliminates trips on Catawba Avenue
- 25-35% delay reduction at Statesville Road & Catawba Avenue

			AM Peak		PM Peak		
Intersection		2014	2035 No-Build	2035 Build	2014	2035 No-Build	2035 Build
Catawba Avenue &	LOS	Α	Α	Α	Α	Α	В
School Street	Delay (sec)	6.7	7.1	7.4	6.9	7.1	12.1
Catawba Avenue &	LOS	Α	В	В	Α	Α	Α
Smith Circle	Delay (sec)	9.1	13.6	10.1	4.6	8.3	7.0
Catawba Avenue &	LOS	Е	F	Е	D	F	Е
Statesville Road (US 21)	Delay (sec)	66.8	113.7	71.1	41.0	81.1	60.3
Statesville Road & Floral	LOS	-	-	F	-	-	D
Lane Extension	Delay (sec)	-	-	57.0	-	-	30.1

- Cost estimate \$900,000
- ❖ 4<sup>th</sup> highest B/C ratio & 4<sup>th</sup> lowest overall ranking



#### **Smithville Lane Extension**

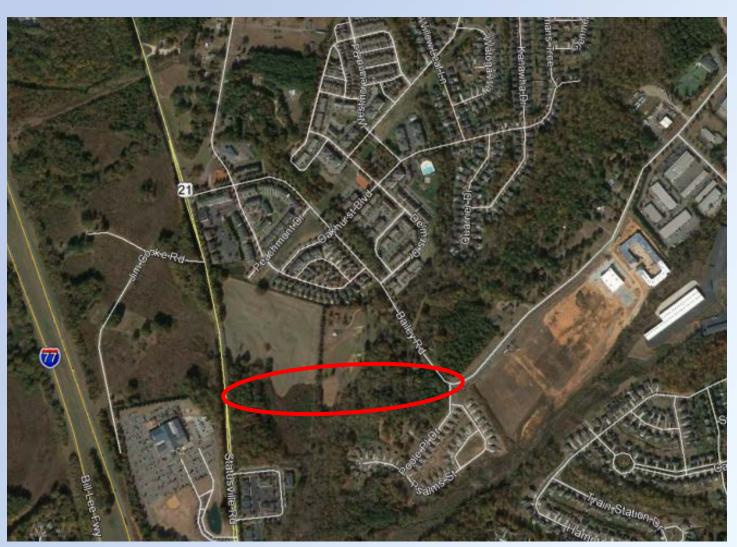
- Proposed extension of Smithville Lane to Statesville Road
- Eliminates trips on Catawba Avenue
- 20% delay reduction at Statesville Road & Catawba Avenue

			AM Peak		PM Peak			
Intersection		2014	2035 No-Build	2035 Build	2014	2035 No-Build	2035 Build	
Catawba Avenue & Ferry	LOS	В	D	D	С	D	D	
Street	Delay (sec)	11.7	31.6	29.3	18.7	31.3	28.6	
Catawba Avenue &	LOS	С	E	D	С	E	D	
South Hill Street	Delay (sec)	21.0	36.5	33.3	21.5	35.7	33.3	
Catawba Avenue &	LOS	Е	F	F	D	F	E	
Statesville Road (US 21)	Delay (sec)	66.8	113.0	89.5	41.0	81.5	66.1	
Statesville Road &	LOS	-	-	С	-	-	С	
Smithville Lane Extension	Delay (sec)	-	-	18.9	-	-	19.4	

- 1 Total Take property
- Cost estimate \$1,100,000
- ❖ 5<sup>th</sup> highest B/C ratio & 3<sup>rd</sup> lowest overall ranking



# **Bailey Road Re-alignment**



PARSONS BRINCKERHOFF

## **Bailey Road Re-alignment (Cont.)**

- Proposed re-alignment/extension of Bailey Road to Statesville Road
- Provides alternate access for Oakhurst development to US 21
- Eliminates curve and "local" road section through Oakhurst
- Reduced delay at Bailey Road & US 21 by 20-50%

			AM Peak		PM Peak		
Intersection		2014	2017		2035 Build		
Statesville Road (US 21)	LOS	С	F	F	С	E	С
& Existing Bailey Road	Delay (sec)	31.4	100.4	83.0	22.8	59.7	28.3
Statesville Road (US 21)	LOS	-	-	Е	-	-	D
& Bailey Road Re- alignment	Delay (sec)	-	-	80.0	-	-	48.9
Bailey Road & Bailey	LOS	-	-	D	-	-	F
Road Re-alignment	Delay (sec)	-	-	25.4	-	-	61.2

- ROW impacts and costs may be offset by developer partnership
- Cost estimate \$3,300,000
- ❖ 4<sup>th</sup> lowest B/C ratio & 3<sup>rd</sup> highest overall ranking



#### **Intersection Improvement Projects**

- Provided additional turn lanes and increased storage of existing
- Significant improvements to traffic operations
  - ➤ Bailey Road & NC 115: 40-50% reduction in delay
  - ➤ Westmoreland Road & US 21: 45-50% reduction in delay

		AM Peak			PM Peak		
Intersection		2014	2035 No-Build	2035 Build	2014	2035 No-Build	2035 Build
Old Statesville Road (NC	LOS	D	F	Е	Е	F	Е
115) & Bailey Road	Delay (sec)	45.7	111.6	66.3	55.6	149.1	72.5

			AM Peak		PM Peak		
Intersection		2014	2035 No-Build	2035 Build	2014	2035 No-Build	2035 Build
Statesville Road (US 21)	LOS	D	F	F	D	F	E
& Westmoreland Road	Delay (sec)	49.6	156.7	85.8	52.6	151.1	76.0

#### Cost estimates

- ➤ Bailey Road & NC 115 \$900,000
- Westmoreland Road & US 21 \$1,300,000
- Ranked 1st and 2nd in B/C ratio and overall ranking



#### **Gem Street Extension**

- Proposed extension of Gem Street to Oak Street
- Provides connectivity to NC 115; Reduces Catawba Ave trips
- Reduces delay at NC 115 & Catawba Avenue by 20%

			AM Peak		PM Peak			
Intersection		2014	2035 No-Build	2035 Build	2014	2035 No-Build	2035 Build	
Catawba Avenue &	LOS	Α	Α	Α	Α	В	Α	
School Street	Delay (sec)	6.7	9.3	7.0	6.9	10.1	6.7	
Catawba Avenue &	LOS	С	E	D	С	E	D	
Meridian Street	Delay (sec)	18.4	35.5	29.5	21.1	40.8	33.5	
Catawba Avenue & Main	LOS	С	E	D	С	E	D	
Street (NC 115)	Delay (sec)	28.5	64.6	52.4	27.8	65.1	51.9	
Main St (NC 115) &	LOS	F	F	В	F	F	С	
Hickory Street	Delay (sec)	60.2	531.5	15.5	73.6	742.7	21.3	

- Significant Utility impacts; RR coordination for traffic signal at Hickory Street & NC 115
- Cost estimate \$1,100,000
- ❖ 3<sup>rd</sup> highest B/C ratio & 4<sup>th</sup> highest overall ranking



#### **Hickory Street Extension**

- Proposed extension of Hickory Street to Antiquity Development
- Provides connectivity to NC 115; Reduces Old Canal St trips
- Reduces delay at NC 115 & Catawba Avenue 5-15%

			AM Peak		PM Peak			
Intersection		2014	2035 No-Build	2035 Build	2014	2035 No-Build	2035 Build	
Main Street (NC 115) &	LOS	С	E	E	С	E	E	
Catawba Avenue	Delay (sec)	28.5	65.6	61.9	27.8	71.1	59.5	
Main Street (NC 115) &	LOS	F	F	В	F	F	В	
Hickory Street	Delay (sec)	60.2	531.5	10.3	73.6	742.7	13.3	

- > Potential additional LOS benefits if implemented with Gem Street Extension
- 2 Total Take properties (Developer Partnership)
- RR coordination for traffic signal at NC 115 intersection
- Cost estimate \$1,700,000\*
- ❖ 3<sup>rd</sup> lowest B/C ratio & 5<sup>th</sup> highest overall ranking (\*5<sup>th</sup> Highest B/C ratio without signal cost)



## **Holiday Lane-Ferry Street Connector**

- Proposed connection between Ferry St, Burton Ln, & Holiday Ln
- Allows traffic to access signal and reduces trips on Catawba Avenue
- Reduces delay at Catawba Avenue & Statesville Road 15-20%

			AM Peak			PM Peak	
Intersection		2014	2035 No-Build	2035 Build	2014	2035 No-Build	2035 Build
Catawba Avenue & Lake	LOS	В	С	С	В	В	В
Village Boulevard	Delay (sec)	12.8	16.8	16.8	11.7	14.5	14.5
Catawba Avenue & Ferry	LOS	С	D	D	С	D	D
Street	Delay (sec)	19.1	31.6	31.4	18.7	31.3	30.6
Catawba Avenue & Hill	LOS	С	E	E	С	E	E
Street/Burton Lane	Delay (sec)	21.0	36.5	36.8	21.5	35.7	35.5
Catawba Avenue &	LOS	E	F	F	D	F	E
Statesville Road (US 21) (Signal)	Delay (sec)	66.8	113.0	89.9	41.0	81.5	68.3
Catawba Avenue & Statesville Road (US 21) (Roundabout)	LOS	-	А	А	-	С	С

- Cost estimate \$1,100,000
- ❖ 2<sup>nd</sup> lowest B/C ratio & 2<sup>nd</sup> lowest overall ranking



## **Project Rankings**

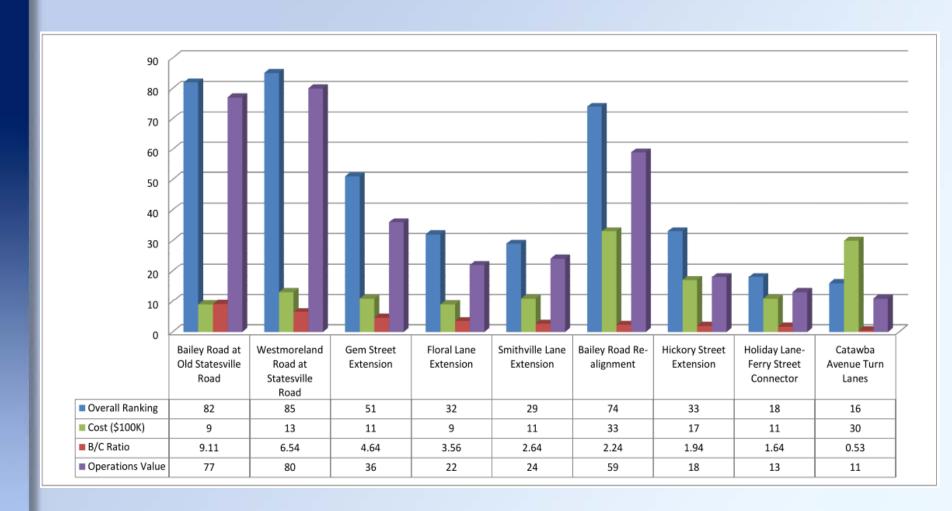
Project	Operations	Connectivity	Safety	Overall	B/C Ratio	Cost (\$100K)
Bailey Road at Old Statesville Road		0	5	82	9.11	9
Westmoreland Road at Statesville Road	80	0	5	85	6.54	13
Gem Street Extension	36	10	5	51	4.64	11
Floral Lane Extension	22	10	0	32	3.56	9
Smithville Lane Extension	24	5	0	29	2.64	11
Bailey Road Re- alignment	59	15	0	74	2.24	33
Hickory Street Extension	18	10	5	33	1.94 *	17 *
Holiday Lane- Ferry Street Connector	13	5	0	18	1.64	11
Catawba Avenue Turn Lanes	11	0	5	16	0.53	30

Total Cost = \$14.4M

\*2.75 B/C Ratio if traffic signal cost removed (5<sup>th</sup> Highest)



# **Project Rankings (Cont.)**





## **Transportation Recommendations**

- Projects to fund with Phase 1 Bond Package (\$5-\$6 Million)
  - Bailey Road & NC 115 (\$900,000)
  - Westmoreland Road & US 21 (\$1,300,000)
  - Gem Street Extension (\$1,100,000\*)
  - Hickory Street Extension (\$1,700,000\*)
  - Floral Lane Extension (\$900,000)
- ❖ Total of \$5,430,000

\*Hickory Street & NC 115 Traffic Signal \$470,000



#### **Questions?**

Richard Odynski, PE

odynskira@pbworld.com

(704) 972-5594

Adam Freeman, PE

freemanja@pbworld.com

(704) 972-5324

Jason Gorrie, PE

gorriejr@pbworld.com

(704) 342-8463

